Green Horse project Scientific Information Review and Consideration

Much of the literature cited by commenters of the Green Horse project during the combined scoping and 30-day comment period addresses a variety of resources, topics, or issues. Members of the Green Horse project interdisciplinary team are considered proficient in their field of study by way of academic achievement, agency training, years of professional experience, and in some cases, certification programs. Team specialists identified the methods used in their analyses and referenced the scientific sources upon which their analyses were based. In their analyses, team specialists discussed responsible opposing science and viewpoints and provided science-based rationale to support their conclusions. They also addressed any incomplete or unavailable information. The interdisciplinary team considered the general principles and recommendations made in the various literature cited below; conclusions and/or determinations supported by effects analyses did not changes. Some articles, scientific studies, and reports were not applicable to the proposed activities. Other articles, scientific studies, and reports provided general or background information and were consistent with the project analysis. Commenters submitted many scientific studies that were either used in the analysis for the EA or were considered in the response to comments (07-012). These references will not appear in the table below.

Table 1. Review and consideration to scientific information and other literature submitted by commenters for the Green Horse project

Reference	Green Horse Project Consideration
Achat et al. 2015. Forest soil carbon is threatened by intensive biomass harvesting. Scientific Reports 5:15991 | DOI: 10.1038/srep15991	Considered, where cited in the comment letter: "Compared with other terrestrial ecosystems, forests store some of the largest quantities of carbon per surface area of land" is consistent with the carbon effects analysis.
Brunsfeld, S. J., Sullivan, J., Soltis, D. E. & Soltis, P. S. 2001 Comparative phylogeography of northwestern North America: a synthesis. In Integrating ecology and evolution in a spatial context. BES symposium vol. (ed. J. Silvertown & J. Antonovics), pp. 319–339. Oxford: Blackwells.	Considered but not used. Not relevant to the Green Horse project. Discusses phylogeography of similar areas across North America. The scope of the Green Horse project is to determine effects of the project on the vegetation and other resources within the project area.
Bull, E. L. and T. W. Heater. 2000. Resting and denning sites of American martens in northeastern Oregon. Northwest Science, 74(3): 179-185	Considered, but not used for the analysis area. More recent science (Shirk et al. 2014) was used.
Buotte et al. 2019. Carbon sequestration and biodiversity co-benefits of preserving forests in the western USA	Considered but not used. Forests can store carbon in soils and plant material as well as in harvested wood products outside of the forest ecosystem. Wood fiber can be used to substitute for products that are more energy-intensive to produce, such as concrete and steel, creating a substitution effect which can result in lower overall greenhouse gas emissions. The negative impacts on carbon stocks caused by disturbances and climate conditions have been modest and exceeded by forest growth. Over half of the stands in the National Forest name NF are middle-aged and older (greater than 80 years) and there has been a sharp decline in new stand establishment in recent decades (Birdsey et al., in press). If the Forest continues on this aging trajectory, more stands will reach a slower growth stage in coming years, potentially causing the rate carbon accumulation to decline. Carbon losses from the forest ecosystem associated with harvests have been relatively small compared to the total amount of carbon stored in the forest, with losses from 1990 to 2011 equivalent to about 0.09 percent of non-soil carbon stocks (Birdsey et al., in press).
Bush et al. 2010 Forest Inventory and Analysis	Bush et al. references the overall forest-wide old growth using Green et al and FIA data. It was not referenced in this project as this project is only looking at the old growth within the project area.
Buskirk, S.W, and Powell, R.A. 1994. Habitat ecology of fishers and American martens. In: Buskirk, S.W., Harestad, A.S., Raphael, M.G., and Powell, R.A. (Eds.), Martens, Sables, and Fishers: Biology and Conservation. Cornell University Press, Ithaca, New York, pp. 283–396, 484p.	Considered and this is consistent with fisher habitat preferences.
Campbell et al. 2012. Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions? Front Ecol Environ 2012; 10(2): 83–90, doi:10.1890/110057	Considered but not used. In the absence of fuel treatments to reduce stand density and fuel loads, the fire-adapted forest where the proposed treatments would take place may be more at risk to large and higher-severity wildfires (Agee and Skinner 2005; Stephens et al., 2013; Addington et al., 2015), resulting in decreased ecosystem services and potentially increased carbon emissions. By reducing the threat of wildfire, the proposed action would create conditions more advantageous for supporting forest health in a changing climate and reducing GHG emissions over the long term.
Clough, Lorraine T. 2000. Nesting Habitat Selection and Productivity of Northern Goshawks in West Central Montana	Considered and this is consistent with Brewer et al. 2009 and the standard design features that comply with EO 13186; Migratory Bird Treaty Act (MBTA); 2016 Forest Service/ Fish & Wildlife Service MOU; and Regional Guidance. Additionally, more recent goshawk science is used in the wildlife habitat descriptions (Moser 2007).
Davis et al., Comparison of USDA Forest Service and Stakeholder Motivations and Experiences in Collaborative Federal Forest Governance in the Western United States, Environmental Management 60: 908-921 (2017).	Not used. The members of collaborative groups are outside the scope of the Green Horse project.
Franklin et al. 1987. Tree Death as an Ecological Process. BioScience 37(8): 550-56.	Considered – not used. The Green Horse project is designed to provide for future snags and course woody debris consistent with Forest Plan standards and Bollenbacher (2009a).
Haig, I.T. 1932. Second growth yield, stand and volume tables for the western white pine type. Technical Bulletin 323. United States Department of Agriculture, Washington, D.C.	This literature was reviewed but not used. Stocking density is not discussed as a factor leading to the purpose and need of the project. The Green Horse project is designed to address the root disease within the stands, not stocking densities.

Reference	Green Horse Project Consideration
Hanson, Chad 2010. The Myth of "Catastrophic" Wildfire: A New Ecological Paradigm of Forest Health. John Muir Project Technical Report	The Green Horse Project is located in timber production Forest Plan management areas or management areas that allow timber production. The Nez Perce Forest Plan goal for wildfire management strategies is to control, confine, and contain. Actions to reduce timber losses due to insect and disease will be implemented when compatible with overall management direction. Control actions will generally be aimed at reducing the risk of infestations through silvicultural treatments in high and moderate risk stands. Therefore, this literature does not apply, as high intensity, or severity fire is not desired outcome in this management area.
Harris et al. 2016. Attribution of net carbon change by disturbance type across forest lands of the conterminous United States. Carbon Balance and Management 11:24, DOI 10.1186/s13021-016-0066-5	Considered, but not used. The proposed activities in the Green Horse project will not result in the loss of forest land. Forest stands are being retained and thinned to maintain a vigorous condition that supports enhanced tree growth and productivity, reduces the risk of insect and disease, and supports sustainable ecosystems thus contributing to long-term carbon uptake and storage.
Hart et al. 2015. Area burned in the western United States is unaffected by recent mountain pine beetle outbreaks, Proceedings of the National Academy of Sciences. Vol. 112 (14): 4375-4380. Harvey et al. 2014. Recent mountain pine beetle outbreaks, wildfire severity, and postfire tree regeneration in the US Northern Rockies. Proceedings of the National Academy of Sciences. Vol. 111: 15120-15125.	Considered but not used. The purpose and need of this project is to reduce hazardous fuels. It is stated multiple times in this research that these findings are widely debated and that even under moderate burning conditions, models predict that mountain pine beetle (MPB) alterations to fuel can result in increased fire severity. In addition, there is an importance to complete tree removal to reduce tree-fall risks where it could impact firefighter or public human life.
Hayward, G.D. and R.E. Escano. 1989. Goshawk nest-site characteristics in western Montana and northern Idaho. Condor 91:476–479.	This publication is referenced in more recent goshawk literature used in the wildlife habitat descriptions (Moser 2007).
Heinemeyer and Jones, 1994	Considered but not used, because more recent and applicable research was used for fisher habitat.
Holbrook, et al., 2018; Kosterman 2014; Squires et al. 2013; Vanbianchi et al. 2017	Not used, because there is no lynx habitat present in the Green Horse project area.
Hudiburg et al. 2019. Meeting GHG reduction targets requires accounting for all forest sector emissions. Environ. Res. Lett. 14: 095005	Considered, but not used. Hudiburg et al. 2019 focuses on all societies and governments accounting for all product-related emissions, not just what the agency can account for. Forests are part of the strategy and states should estimate emissions with consistent wood product life cycle assessments.
Hutto 2008, The Ecological Importance of Severe Wildfires: Some Like it Hot. Ecological Applications 18(8): 1827-1834	Considered, but used. These findings highlight the fact that severe fire provides an important ecological backdrop for fire specialists like the Black-backed Woodpecker, and that the presence and importance of severe fire may be much broader than commonly appreciated. Hutto 2008 is consistent with the black-backed woodpecker analysis.
Johnson, K.N. and J.F. Franklin. 2009. Restoration of federal forests in the Pacific Northwest: Strategies and management implications.	For old growth; the project is currently meeting Forest Plan standards.
Jones (undated)	Trapping Seasons are administered by the Idaho Fish and Game Department. Jones (undated) is not relevant to the analysis in this project.
Law et al. 2018. Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences. Vol 115(4): 3663-3668.	Considered but not used. Declines in new stand establishment and the majority of stands being middle-aged and older; this aging trajectory means more stands will reach a slower growth stage in coming year, potentially causing the rate carbon accumulation to decline. The Green Horse project proposes to create over 1500 acres of new stands.
McCauley, Lisa A., Robles, Marcos D., Wooley, Travis, Marshall, Robert M., Kretchun, Alec, Gori, David F. 2019. Large- scale forest restoration stabilizes carbon under climate change in Southwest United States. Ecological Applications, 0(0), 2019, e01979.	Reviewed but not used. The study took place in a dry fire-adapted forest and compared different management strategies including thinning and prescribed fire, with a purpose of reducing wildfire severity. The purpose of the Green Horse project is to address the root disease and insect-caused mortality found within the stands, and to maintain appropriate forest cover long-term on the site while maximizing growth and yield.
McClelland, B. R., and P. T. McClelland. 1999. Pileated woodpecker nest and roost trees in Montana: links with old growth and forest "health." Wildlife Society Bulletin 27: 846- 857.	Considered but not used. Moser 2007 is used as the recent study occurred on the Forest and metrics of the nest tree were slightly different than McClelland and McClelland 1999.
Meddens et al. 2018. Fire Refugia: What Are They, and Why Do They Matter for Global Change? BioScience 68: 944-954	Considered but not used. Project is in proximity to recent low severity wildfire, and or unburned areas.
Krawchuk et al. 2016. Topographic and fire weather controls of fire refugia in forested ecosystems of northwestern North America. Ecosphere 7(12): pp. 1-18, Article e01632	Considered but not used. Project will allow for unburned areas and is near recent low severity wildfire.
Morrison, M. L., and M. G. Raphael. 1993. Modeling the dynamics of snags. Ecological Applications. 3:322-330. Raphael, M. G., and M. White. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. Wildlife Monographs. 86:1-66. Thomas, J. W. 1979. Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington.	Considered, but not used. The Green Horse project is consistent with Forest Plan standards and Regional guidelines (Bollenbacher et al. 2009) for snag requirements.

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U.S. Department of Agriculture, Forest Service, Agriculture Handbook No. 553, Washington, D.C. Zarnowitz, J. E., and D. A. Manuwal. 1985. The effects of forest management on cavity-nesting birds in northwestern Washington. Journal of Wildlife Management. 49:255-263.	
Odion et al. 2004. Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California. Conservation Biology 18(4):927-936	Considered but not used. This literature is for West Klamath Mountains. Different vegetation structure and weather patterns than the Green Horse project on the Nez Perce-Clearwater.
Odion et al. 2014. Examining Historical and Current Mixed- Severity Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America. PLLOS One 9(2): pp. 1-14.	Considered but not used. Agree with the statement fire is weather and climate driven, and there are organisms in our forest that rely on or dependent on high-severity or mixed –severity fire regimes, but this project is to reduce hazardous fuels and wildfire risk. The Green Horse project treatments are proposed to help in controlling fire and aiding suppression efforts.
Bradley et al. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States? Ecosphere 7(10); pp. 1-13, Article e01492	Considered but not used. This literature pertains to the difference in fire severity in varying forest protection status lands. Although the Green Horse project area does contain Idaho Roadless Areas; the Forest Plan management area direction is to control, confine, and contain wildfire as well planning ignitions.
Zald and Dunn 2018. Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape. Ecological Applications 28(4): 1068-1080.	thinner bark and lower crown heights. It will incorporate a variety of stand composition, crown heights, natural openings, and untreated areas.
Powell, R.A. 1994. Structure and spacing of Martes populations. in Martens, Sables, and Fishers: Biology and Conservation, pp.101-121. Edited by S.W. Buskirk, A.S. Harestad, M.G. Raphael and R.A. Powell. Cornell University Press: Ithaca, NY.	Considered but not used. More recent literature used that covers analysis of martens and fishers.
Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce, G. Goodwin, R. Smith, and E.L. Fisher. 1992. Management recommendations for the Northern Goshawk in the southwestern United States. USDA Forest Service General Technical Report RM-217, Fort Collins, CO U.S.A.	This reference was not used, as more recent research (that occurred on the Forest) is more relevant (Moser 2007).
L.F. Ruggerio, Eco Report, Scientific Independence: A Key to Credibility pp. 1,2 4 (2007).	Considered but not used- opinion piece that has no relevance to the proposed project.
Aubry et al. 2013. Meta-Analysis of Habitat Selection by Fishers at Resting Sites in the Pacific Coastal Region. The J. of Wildlife Management 77(5): 965-974.	Considered but not used because this study focused on fisher habitat selection in the Pacific Coastal Region that is of different vegetation and climate that the Green Horse project area.
Schultz, C. 2010. Challenges in connecting cumulative effects analysis to effective wildlife conservation planning. BioScience 60:545–551.	Considered, but not used. The author's case study finds that cumulative effects analysis based on habitat metrics fail to account for long-term or broad-scale impacts on population monitoring. Habitat metrics are used for wildlife species analysis at the project or larger scale to identify potential habitat, and the possible impacts of the project actions to species in the analysis area. In addition, based on case law, it is appropriate for the agency to use measurements of habitat availability as a proxy for population/viability assessments (Inland Empire Public Lands Council v. USFS 1995, Lands Council v. McNair 2008).
Tepley et al. 2013, Fire-mediated pathways of stand development in Douglas-fir/western hemlock forests of the Pacific Northwest, USA, Ecology 94(8): 1729-43	Considered but not used. This study discusses the use of fire in developing old growth stands. The Green Horse Project is allowing fire to back into old growth stands as long as resource needs are being met and project is in compliance with Forest Plan standards, design features and mitigations.
Westerling et al. 2006. Warmer and Earlier Spring Increase Western U.S. Forest Wildfire Activity. Science 313: 940-43	Considered not used. Project area has land-use history with impact on fire risks.
Brunelle and Whitlock 2003. Postglacial fire, vegetation, and climate history in the Clearwater Range, Northern Idaho, USA. Quaternary Research 60: 307-318	This reference was not used, agree if drought conditions associated with the insolation maxima are an appropriate analog for future summer conditions resulting from the increase in atmospheric greenhouse gases, the shift towards more frequent crown fires may be persistent. Analysis was based on extreme conditions.
Western Hemlock Looper https://apps.fs.usda.gov/r6_decaid/views/western_hemlock_looper.html	Considered – not used. Information was consistent with more recent information obtained from Forest Health Protection.
Witmer et al., 1998	Considered but not used because the decline of fishers is acknowledged by more recent research.